

Amendments to the Claims:

1. **(Currently Amended)** A method for determining a bandwidth required for meeting one or more quality-of-service ("QoS") criterion on a transmission link comprising the steps of:

generating a plurality of streams of traffic for the transmission link;

5 conducting a plurality of simulations of bandwidth for the link, based on generated traffic streams and using systematically varying values of the one or more QoS criterion;

developing a statistical model of the transmission link based on the simulations,
~~addressed to a relationship between the statistical model specifying a bandwidth~~
~~requirement for achieving at least one of the and the one or more QoS criterion as a~~
10 function of bandwidth, traffic load, queuing delay and packet loss, the model further
specifying a link utilization (u), defined as a ratio of traffic load (τ) on the link to link
bandwidth (β) ($u = \tau/\beta$), as an algebraic function of queuing delay (δ) and delay probability
(ω) based on the simulations; and

15 applying the developed model to determine bandwidth required to meet the one or more QoS criterion on a link

~~wherein the developed model is provided as a function of bandwidth, traffic load, queuing delay and packet loss.~~

2. **(Original)** The method of claim 1 wherein each of the generated traffic streams has a fixed traffic bit rate and the traffic bit rate varies from stream to stream.

3. **(Original)** The method of claim 1 wherein the streams of traffic are organized into packets and the traffic streams are defined by packet arrivals and sizes.

4. **(Original)** The method of claim 1 wherein the traffic streams are generated synthetically based on a statistical model.

5. **(Original)** The method of claim 4 wherein the statistical model is a Fractional Sum Difference model.

6. **(Original)** The method of claim 1 wherein the step of conducting plural simulations includes the sub-steps of:

choosing a trial bandwidth for a given simulation; and

iteratively repeating the simulation with an incremental change in the trial

5 bandwidth until a QoS value realized for the simulation substantially matches a selected QoS criterion.

7. **(Previously Presented)** A method for determining a bandwidth required for meeting one or more quality-of-service ("QoS") criterion on a transmission link comprising the steps of:

generating a plurality of streams of traffic for the transmission link;

5 conducting a plurality of simulations of bandwidth for the link, based on generated traffic streams and using systematically varying values of the one or more QoS criterion;

developing a model addressed to a relationship between bandwidth and the one or more QoS criterion based on the simulations; and

10 applying the developed model to determine bandwidth required to meet the one or more QoS criterion on a link;

wherein the developed model is of the form:

$$\log_2\left(\frac{u}{1-u}\right) = \mu + o_\delta \log_2(\delta) + o_\omega (-\log_2(-\log_2(\omega))) + \epsilon,$$

where u is the QoS utilization, δ is the queuing delay, ω is the delay probability, ϵ is a random variable with mean 0 and variance $\sigma^2(\epsilon)$, μ is a constant for a given traffic

15 stream, serving as a summary of the statistical properties of the stream, and o_δ and o_ω are empirically determined constants.

8. **(Original)** The developed model of the form claimed in claim 7 wherein:

$$o_\delta \cong 0.379, o_\omega \cong 0.863 \text{ and } \sigma^2(\epsilon) \cong 0.113$$

9. **(Original)** The developed model of the form claimed in claim 7 wherein:

$$\mu = o + o_\tau (\log_2(\tau) - 24) + \zeta$$

where ζ is a random variable with mean 0 and variance $\sigma^2(\zeta)$ and o and o_τ are empirically determined constants.

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10. **(Original)** The developed model of the form claimed in claim 9 wherein:

$$o \cong 5.500, o_{\tau} \cong 0.709 \text{ and } \sigma^2(\zeta) \cong 0.036$$

11. **(Previously Presented)** A method for determining a bandwidth required for meeting one or more quality-of-service ("QoS") criterion on a transmission link comprising the steps of:

generating a plurality of streams of traffic for the transmission link;

5 conducting a plurality of simulations of bandwidth for the link, based on generated traffic streams and using systematically varying values of the one or more QoS criterion;

developing a model addressed to a relationship between bandwidth and the one or more QoS criterion based on the simulations; and

10 applying the developed model to determine bandwidth required to meet the one or more QoS criterion on a link;

wherein the developed model is of the form:

$$\text{logit}_2(u) = o + o_{\tau}\tau + o_{\delta}\log_2(\delta) + o_{\omega}(-\log_2(-\log_2(\omega))) + \psi,$$

where u is the QoS utilization, τ is the link bit rate, δ is the queuing delay, ω is the delay probability, $\psi = \epsilon + \zeta$ is a normal random variable with mean 0 and variance

15 $\sigma^2(\psi) = \sigma^2(\epsilon) + \sigma^2(\zeta)$ and o, o_{τ}, o_{δ} and o_{ω} are empirically determined constants.

12. **(Original)** The developed model of the form claimed in claim 11 wherein:

$$o \cong 5.500, o_{\tau} \cong 0.709, o_{\delta} \cong 0.379, o_{\omega} \cong 0.863 \text{ and } \sigma^2(\psi) \cong 0.119.$$

13 - 18 (Cancelled)